THE APPLICATION OF DOCKAGE IN THE MARKETING OF WHEAT

FARMERS' BULLETIN 919

UNITED STATES DEPARTMENT OF AGRICULTURE

Contribution from the Bureau of Markets

CHARLES J. BRAND, Chief

Washington, D. C. November, 1917

Show this bulletin to a neighbor. Additional copies may be obtained free from the Division of Publications, United States Department of Agriculture

WASHINGTON : GOVERNMENT PRINTING OFFICE : 1917

THE APPLICATION OF DOCKAGE IN THE MARKETING OF WHEAT.

CONTENTS.

THE ATTENTION of the Department of Agriculture has been directed to certain misunderstandings that have arisen among buyers and sellers of wheat in connection with the assessment of dockage in the buying of wheat by grade in some sections of the country since the official grain standards of the United States for wheat became effective. Dealers in some localities where the factor of dockage was not a part of the grading system in the past have adopted certain unfair practices which they have alleged have been made necessary by reason of the inclusion of the factor of dockage in the official grain standards of the United States for wheat under the United States grain standards Act. It is believed, however, that most of the trouble which has arisen is the result of unfamiliarity with the application of the dockage principle and will disappear as soon as its use is more clearly understood. The purpose of this bulletin is to explain clearly to the grain farmers and dealers of the country the methods of determining dockage and its relation to the marketing of wheat under the United States grain standards Act.

WHAT DOCKAGE IS.

The order of the Secretary of Agriculture dated March 31, 1917, which fixed, established, and promulgated the official grain standards of the United States for wheat [1] refers to one of the factors taken into consideration in the official grades as "dockage," and defines it as follows:

Dockage includes sand, dirt, weed seeds, weed stems, chaff, straw, grain other than wheat, and any other foreign material, which can be removed readily from

[1] See United States Department of Agriculture, Office of Markets and Rural Organization, Service and Regulatory Announcements, No. 22, issued Mar. 31, 1917.

the wheat by the use of appropriate sieves, cleaning devices, or other practical means suited to separate the foreign material present; also undeveloped, shriveled, and small pieces of wheat kernels necessarily removed in properly separating the foreign material.

EQUIPMENT FOR SEPARATING DOCKAGE.

In determining the quantity of dockage in connection with the official grading of wheat the following cleaning devices are used in the Offices of Federal Grain Supervision of the United States Department of Agriculture (see fig. 1):

1. A small wheat tester or device for removing barley, oats, wild oats, pieces of straw, weed stems, and other coarse matter from wheat.

This is a modified form of the machine already in general use in the spring-wheat belt, where the dockage system has been practiced for many years. On account of the peculiar short, jerky motion of the riddle, this machine has been popularly designated as the "wild-oat kicker."

2. Set of perforated metal hand sieves consisting of—

(*a*) Bottom pan: Inside diameter of pan should be 13⅛ inches; depth, 2½ inches; and roll at top of pan $\frac{3}{16}$ inch in diameter.

(*b*) Buckwheat sieve: With triangular perforations $\frac{8}{64}$ inch long on each side of perforations; inside diameter of sieve should be 13 inches, depth 2 inches, and roll at top of sieve ¼ inch in diameter.

(*c*) Fine seed sieve: With round perforations one-twelfth inch in diameter. (Other specifications and dimensions same as for (*b*) buckwheat sieve above.)

(*d*) Fine chess sieve: With slotted perforations 0.064 inch wide by three-eighths inch long. (Other specifications and dimensions same as for (*b*) buckwheat sieve above.)

(*e*) Coarse chess sieve: With slotted perforations 0.070 inch wide by one-half inch long. (Other specifications and dimensions same as for (*b*) buckwheat sieve above.)

(*f*) Scalper sieve: With round perforations $\frac{12}{64}$ inch in diameter; depth of sieve should be 1½ inches; inside diameter 12⅞ inches; and roll at top of sieve $\frac{5}{16}$ inch in diameter.

NOTE.—Sieves (*b*), (*c*), (*d*), and (*e*) should be made to nest very freely with the bottom pan. The scalper sieve (*f*) should nest very freely with each of the other four sieves and also with the bottom pan.

It is absolutely essential that the dimensions of the perforations of the sieves used be exactly as has been stated. A slight variation in the dimensions materially influences the percentages of dockage obtained. In order to secure the exact sizes it is necessary that the perforations be cut with dies especially made for the purpose. Sieves made from tin or galvanized iron with an ordinary punch will not give accurate results.

From experiments in hand screening and cleaning various kinds of foreign matter from wheat it has been found that with proper care metal sieves with perforations as indicated for hand sieves, used in connection with the wild-oats separator, will give a practical determination of dockage.

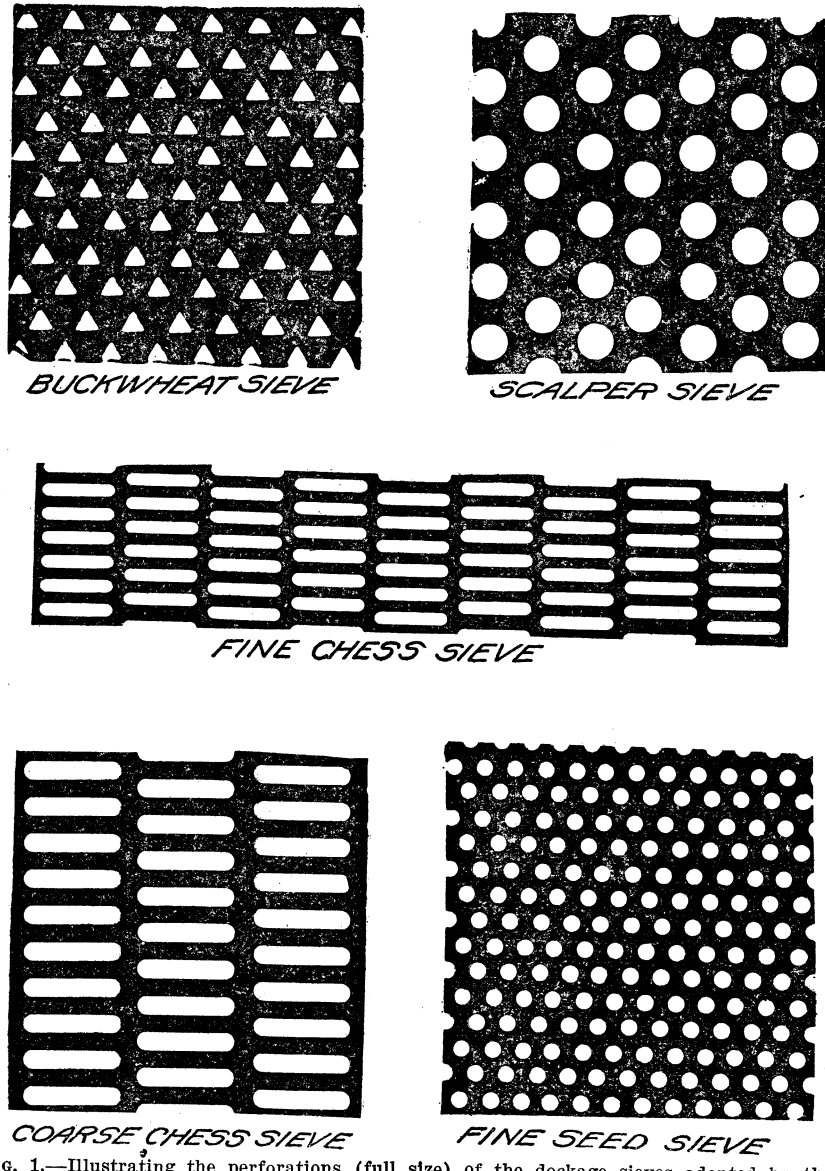

FIG. 1.—Illustrating the perforations (full size) of the dockage sieves adopted by the United States Department of Agriculture in connection with the enforcement of the United States grain standards act. Buckwheat sieve, triangular perforations 8/64 inch long on each side of perforation; scalper sieve, round perforations 12/64 inch in diameter; fine chess sieve, slotted perforations, 0.064 inch wide by 3/8 inch long; coarse chess sieve, slotted perforations 0.070 inch wide by 1/2 inch long; fine seed sieve, round perforations 1/12 inch in diameter.

METHOD USED IN DETERMINING DOCKAGE.

Great care must be taken that the sample on which the dockage determination is made is a representative, average sample of the lot or parcel of wheat which it represents.

Such sieve or sieves should be used in making this determination as will remove the foreign material with the least possible loss of wheat, including small, plump, or badly shriveled kernels, or large pieces of broken kernels. As a general rule, the use of the fine seed sieve with round perforations one-twelfth inch in diameter, and the scalper sieve or the "wild oat kicker" will be sufficient. However, if the sample contains an appreciable quantity of wild buckwheat, pigeon grass, or other seeds of a similar character, or foreign material, which will not pass through the fine seed sieve, then the buckwheat sieve should be used. All material passing through the buckwheat sieve should be considered as dockage, except that whenever the screenings removed by this sieve consist of an appreciable quantity of small shriveled kernels, the material so removed should be rescreened over the same sieve. In rescreening, the material should be deposited carefully at one edge of the sieve; then, while the sieve is held at an angle of 25° or 30°, the sieve should be tapped lightly until all the material has passed either to the opposite edge of the sieve or through the perforations. If operated properly, the material at the opposite edge of the sieve will consist mainly of wheat and should be classed as wheat and not as dockage. The material that passes through the sieve will consist mainly of wild buckwheat and other weed seed, together with a small percentage of shriveled kernels and small broken pieces of wheat, and all this material should be classed as dockage. In exceptional cases it may be necessary to repeat the rescreening in order to arrive at an equitable determination of the percentage of dockage.

The chess sieves should not be used unless the sample in question contains an appreciable quantity of chess, keeping in mind that wheat containing less than one-half of 1 per cent of dockage is considered as commercially clean wheat. As a general rule, the chess sieves likewise should not be used until after the sample has been screened, either over the fine seed or the buckwheat sieve, as the sample may require. Whenever it is necessary to screen for chess, the fine chess sieve with perforations 0.064 by $\frac{3}{8}$ inch should be used, except when the sample consists of wheat of large kernels mixed with large chess seeds. Large chess seeds in a sample of wheat consisting mainly of small kernels from which the chess can not be separated readily should be considered as "inseparable" foreign matter and not as dockage, and the sample should be handled and graded accordingly.

Whenever the fine chess sieve is used and the screenings consist of an appreciable quantity of small, shriveled, or split kernels, the material so removed should be rescreened over the same sieve by the same process as that described for rescreening over the buckwheat sieve. In rescreening over the chess sieve, the material should flow with and not across the slots.

The scalper sieve is to be used for removing coarse foreign material. Any thrashed wheat kernels that remain on the scalper sieve should be picked out and returned to the wheat and should not be considered as dockage.

The dockage, therefore, will be represented by the coarse foreign material and the finer screenings obtained by hand sieving. Since any foreign matter remaining in the wheat after the removal of dockage is considered as inseparable, and consequently directly affects the grade, great care should be used in sieving the samples.

The order of the Secretary of Agriculture previously referred to also requires that after the dockage has been properly determined—

> The quantity of dockage shall be calculated in terms of percentage based on the total weight of the grain, including the dockage. The percentage of dockage so calculated shall be stated in terms of whole per centum and half per centum. A fraction of a per centum when equal to or greater than a half shall be treated as a half, and when less than a half shall be disregarded. The percentage of dockage so determined and stated shall be added to the grade designation.

VALUE OF DOCKAGE.

Ordinarily the dockage can be removed from the wheat with comparatively simple cleaning machinery, such as is installed in many of the country elevators and mills. Usually the dockage can be removed also with an ordinary portable fanning mill equipped with screens having perforations like those specified for the dockage sieves.

That part of the dockage which is not wheat not only has no value for flour-milling purposes, but often contains ingredients which are positively harmful when ground with the wheat.[1] However, the dockage found in wheat has in many cases a real value. This value depends on the nature of the material making up the dockage. Dockage frequently contains considerable quantities of nutritious weed seeds, wild mustard, flaxseed, wild oats, other grains, and undeveloped, shriveled, and small pieces of wheat kernels. Much of this material can be used to good advantage as poultry feed or feed for other stock. Such material as wild mustard and flaxseed can be removed from dockage in practically a pure state with special cleaning machinery, such as is usually found in the terminal elevators and

[1] The injurious effects on the milling and baking qualities of straight flour made from wheat containing various kinds of impurities are given in detail in United States Department of Agriculture Bulletin No. 328, entitled "Milling and Baking Tests of Wheat Containing Admixtures of Rye, Corn, Cockle, King Head, and Vetch," issued Dec. 30, 1915.

the larger flour mills handling wheat containing these ingredients, and, when so separated, command a good price on the market.

The farmer, of course, does not expect the grain merchant or miller to pay wheat prices for dirt, weed seeds, sand, chaff, and other foreign material found commonly in wheat. The grain dealer and miller can not and do not do this under any system of grading. When the dockage system of grading is not employed, the buyer takes into account the amount of foreign material found in the wheat and fixes the price at a figure which insures a safe purchase. In other words, a deduction is made in the price paid commensurate with the amount and kinds of foreign material present in the grain. Frequently, however, the grain merchant and miller buy all wheat as delivered at a flat rate, in which case the price paid is sufficiently low to protect the purchaser against losses due to foreign material delivered with the general run of grain. When the flat-rate method of purchase is followed, farmers with little or no dockage in their grain are obliged to sell at a comparatively low figure in order to protect the purchaser who receives from other farmers at the same price grain containing a considerable quantity of foreign material. When the dockage system is properly employed, the purchaser bases the price upon the intrinsic value of the grain as delivered. Therefore, the farmer who delivers grain with little or no foreign material in it receives full value for his product and is not obliged to take less than its worth in order that other farmers may receive the same market price for grain containing weed seeds and other foreign material.

METHODS OF HANDLING DOCKAGE.

The methods of handling dockage most commonly employed at present are the following:

(1) The wheat is cleaned on the farm, and only the clean wheat is hauled to market.

(2) The wheat as delivered to the country stations by the farmer is run over the proper cleaning machinery at the elevator or mill and the actual dockage is separated and returned to the farmer. It is the practice in some sections to make a small charge for such service, and in others to perform the service without cost to the farmer.

(3) The wheat is screened properly by the local buyer, payment is made to the farmer on the basis of the clean wheat only, and the dockage is retained by the elevator or mill as compensation for its service in removing it.

(4) The wheat containing the dockage is sold to the local buyer, who in turn consigns it to a commission man at a terminal market with the understanding that the commission man will secure the best

possible price not only for the wheat as if it were clean but for the wheat plus the value of the dockage which it contains.

The first two methods mentioned, in which only the screened wheat is delivered to the local buyer, tend to minimize the variation in the grade of wheat delivered by different farmers in the same locality and should result in greater confidence in the grades given by the local buyer. Furthermore, these methods enable the farmer to utilize the foreign material for feed or to sell it locally. The material so removed should be ground so as to destroy the vitality of the noxious seeds. In many cases such material, when removed, has a relatively high value as feed, and it is believed that farmers will find that it is often to their advantage to remove the dockage themselves or to have their local buyer do it for them, even though it may be necessary to pay a small fee for this service.

When the dockage is separated by the local buyer who retains it as compensation for the extra labor involved, as well as for compensation for the additional time and equipment needed by the elevator or mill to perform this service, as noted in the third method mentioned, it is allowed to accumulate at the elevator or mill and is either shipped to a terminal market in bulk, or, in cases of smaller accumulations, sacked and sold locally for feed. Such a method of handling dockage means, of course, that the total weight of the foreign material is donated by the farmer to the local buyer, and in many cases this foreign material has considerable value. This method may be a very efficient way of handling the entire factor of dockage in farmers' cooperative elevators where the farmer is financially interested. It means, of course, that whatever material of value there is in the dockage can be disposed of with the greatest efficiency and to the greatest advantage to all the farmers interested in the elevator and can be prorated back at the end of a season's business.

When wheat containing dockage is consigned to a commission man at a terminal market, as noted in the fourth method mentioned, the commission man under normal marketing conditions will sell the wheat by exhibiting a sample on the exchange floor, or otherwise, and secure the best possible price for the grain as it lies in the car. Consideration is given not only to the wheat itself but also to the wheat plus the dockage, provided, of course, that the dockage is of such nature that it has some commercial value in itself.

It is not unusual for a certain lot or parcel of wheat to contain a comparatively high percentage of dockage having a commercial value in itself. It is the function and duty of the commission man at the terminal market to obtain the greatest returns in such cases, and it is believed that in a large majority of cases this is done.

IMPROPER APPLICATION OF DOCKAGE SYSTEM.

One of the incorrect methods used by dealers in determining the amount of dockage has been arbitrarily to deduct a given amount by weight from all wheat purchased, regardless of the actual amount of dockage present. They have been doing this in lieu of providing themselves with proper facilities for accurately determining the percentage of dockage contained in the wheat. Information has reached the United States Department of Agriculture that in several localities this amount has been arbitrarily fixed as one bushel per wagonload of approximately 60 bushels. The practice is both unfair and unjust, and ultimately can not prevail. The taking of 1 bushel from a wagonload of 60 bushels is equivalent to a dockage of 1.66 per cent, while on the basis of 1 bushel in 50 it is equivalent to 2 per cent. Data which the department has gathered covering a period of five years relative to the dockage in wheat marketed in the localities in which this practice is at present prevalent show definitely that on the basis of the official grain standards of the United States for wheat approximately 25 per cent of the wheat received from the farmers in these localities is free from dockage, 25 per cent contains one-half of 1 per cent dockage, and the remaining 50 per cent shows a dockage ranging from one-half of 1 per cent upward. It is evident, therefore, that the practice of making an arbitrary assessment of dockage, regardless of the actual condition of the wheat, not only encourages the marketing of wheat containing weed seeds and foreign material but also greatly discourages general improvement in marketing conditions and good farming methods.

The department has also been advised that in some sections wheat buyers are first ascertaining properly the percentage of dockage in the wheat and deducting the weight of the dockage from the weight of the load. The buyers then determine the test weight per bushel upon the uncleaned wheat before the dockage is removed, and place their grade and consequent price upon the wheat in that condition in the same manner that they did prior to the time when the official grain standards for wheat were fixed. This is frequently unfair to the seller, for the reason that the test weight of wheat containing dockage usually will be lower than the test weight of the same wheat after the dockage has been removed. The standards specifically provide that each determination other than that of dockage for the purpose of these standards shall be made upon the basis of the grain when free from dockage. In other words, the grade of the grain, with the exception of dockage, should be determined upon the dockage-free grain.

The primary purpose in the passage of the United States grain standards act was to provide for the establishment of a single set of standards of quality and condition for grain to govern the grading thereof and to be applied uniformly to shipments in interstate or foreign commerce. Unfair practices such as those which have been described tend to defeat one of the wholesome ends sought in the broad application of the United States grain standards Act—improved conditions of marketing agricultural products. Such practices frequently occur at country points in connection with transactions which are purely intrastate in character. Unfortunately the criminal penalties of the grain standards act can not be administered to prevent them. The department, however, will do everything in its power to bring about the discontinuance of misrepresentations based on the act or the standards thereunder.

OTHER DETERMINATIONS MADE ON DOCKAGE-FREE WHEAT.

The standards provide that determinations made in connection with the wheat grades, with the exception of dockage, shall be made on the basis of the grain from which the dockage has been removed. In other words, the test weight per bushel, moisture content, damaged kernels, heat-damaged kernels, inseparable foreign material, odor, color and texture, temperature, general appearance, wheat of other classes and of subclasses, etc., must be determined on the basis of the wheat after the dockage has been removed.

It is unfair, therefore, for the purchaser to discount the seller for the weight of the dockage and at the same time make the weight per bushel test on the grain before the dockage is removed. Such a practice may result in a lower grade with a corresponding discount in price. The seller may therefore be subjected to two discounts from the basic price—one in the form of deduction in weight because of the presence of dockage and the other because of the lowering of the numerical grade on account of improper methods of making the test weight and other determinations.

CONCLUSIONS.

From the foregoing it would appear that the majority of the objections to the assessment of dockage have arisen through misunderstandings as to the proper methods of applying dockage to the grading of wheat.

It will be seen that dockage is an essential element in arriving at the true grade of wheat and that this dockage may consist either of useful or harmful foreign materials.

The United States grain standards act and the official grain standards of the United States for wheat do not in any way provide for an arbitrary discount for dockage or any other cause. The farmer who is called upon to accept such discount or deduction should not do so until he has first required the buyer to show that the discount or deduction is actually justified, including his authority for doing so.

The various methods of handling dockage should be carefully investigated and the one adopted which is best suited to the needs of the individual. It would appear advisable, when a large percentage of dockage is present in wheat, to remove it on the farm or at the point of shipment and thus avoid the payment of the freight rate for wheat on dirt, chaff, or weed seeds, etc.

It will be apparent that a correct dockage system in operation will protect the farmer from the possibility of low prices fixed by the buyer in order to insure a safe purchase, and that under the dockage system of grading the farmer should get a higher numerical grade for his wheat that contains dockage than he would under a system of grading which does not require a determination for dockage but which takes into account the total foreign material present in the determination of the numerical grade.

The primary purpose of the United States grain standards act is to establish a single set of standards of quality and condition for grain, and it is believed that after a careful reading of the facts set forth in this bulletin it will be evident that the operation of a correct system of dockage plays an important part in obtaining this result, in so far as wheat is concerned.

○